Notice of Allowability	Application No.	Applicant(s)	
	09/695,647	MERRIAM, JOHN STEVENS	
	Examiner	Art Unit	
	Chieh M. Fan	2638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *the amendment filed 2/16/05*.

2. ☒ The allowed claim(s) is/are *1-27 and 29-41*.

3. ☒ The drawings filed on *2/16/05* are accepted by the Examiner.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

DETAILED ACTION

Examiner's Amendment

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Jerry Pechanek on 06/17/05.

The application has been amended as follows:

In the claims:

Claims 1, 6, 7, 10, 14, 23, 24, 26, 29, 32, 33, 35-38 and 41 have been amended as the following:

1. (currently amended): A receiver system configured to receive digitally modulated signals for use in a communications system employing a transmitter configured to transmit digitally modulated signals operating in a band of frequencies that is divided into two or more non-overlapping channels, with each channel occupying no more than a predetermined maximum frequency band, the receiver system comprising:

one or more analog to digital converters (ADCs), the number of ADCs being less than the number of non-overlapping channels, the one or more ADCs being configured to convert the entire band containing two or more

non-overlapping channels to a digital data stream sampled at a rate of at least twice the highest frequency within the band;

a front end processor configured to receive the data stream and to down-convert to baseband and decimate this data stream to produce an output data stream that represents each channel within the band, with samples for each channel within the band at a rate that is a multiple of the symbol rate for the ~~given~~ corresponding channel; and

a receiver containing an indexer configured to operate on the output data stream, sequencing through the ~~multiple~~ two or more non-overlap channels so that data, including phase state, time state, and equalizer state, related to each channel is processed in sequence to phase correct, time correct, and equalize the output data stream for all the ~~constituent~~ non-overlapping channels.

6. (currently amended): The receiver system of claim 2 wherein the receiver further comprises:

an input for receiving ~~a~~ the output data stream representative of the entire band, with each channel within the band converted to baseband and sampled at a rate of at least twice the symbol rate of the ~~related~~ corresponding channel;

an equalizer configured to equalize the data for each of the ~~constituent~~ non-overlapping channels;

a timing recovery circuit configured to recover timing information for each of the ~~constituent~~ non-overlapping channels; and

a phase recovery circuit configured to recover phase information for each of the ~~constituent~~ non-overlapping channels, wherein the indexer controls the cycling data through the equalizer, the timing recovery, and phase recovery circuits so that data related to each channel is processed by each of the ~~component~~ equalizer, the timing recovery, and phase recovery circuits in sequence, thereby requiring only one phase recovery, one timing recovery and one equalization circuit for all the channels within the ~~multi-channel~~ non-overlapping channel band.

7. (currently amended): The receiver system of claim 6 wherein the receiver further comprises:

data memory configured to store data for each of the ~~constituent~~ non-overlapping channels separately.

10. (currently amended): The receiver system of claim 9 wherein the rate at which data is written to each channel-related division of the buffer is equal to the rate at which data is extracted from the buffer multiplied by the ratio of storage area devoted to the corresponding channel compared to the total storage area of the data memory dedicated to storing channel data.

14. (currently amended): The receiver system of claim 13 further comprising a plurality of down-converters configured to down convert to baseband the ~~component~~ non-overlapping channels within the band in parallel.

23. (currently amended): A method of providing communications comprising the steps of:

(A) transmitting digitally modulated signals operating in a band of frequencies that is divided into two or more non-overlapping channels, with each channel occupying no more than a predetermined maximum frequency band;

(B) receiving the digitally modulated signals;

(C) employing one or more analog to digital converters (ADCs), the number of ADCs being less than the number of non-overlapping channels to convert the entire band to a digital data stream sampled at a rate of at least twice the highest frequency within the band;

(D) receiving the data stream from the one or more ADCs and down-converting to baseband the data stream;

(E) decimating the data stream to produce an output data stream that represents each channel within the band, with samples for each channel within the band at a rate that is a multiple of the symbol rate for the ~~given~~ corresponding channel; and

(F) sequencing, by an indexer, through the ~~multiple~~ two or more non-overlapping channels so that data, including phase state, time state, and equalizer state, related to each channel is processed in sequence to phase correct, time correct, and equalize the output data stream for all the ~~constituent~~ non-overlapping channels.

24. (currently amended): The method of claim 23 wherein the digitally modulated signals are upstream communications through a coaxial cable from a subscriber to a headend where ~~the~~ a receiver system resides in a cable television system.

26. (currently amended): The method of claim 23 further comprising the ~~step of~~ steps of:

(G) transmitting signals from a subscriber to a receiver system located in a mini headend, the receiver system connected to subscribers through coaxial cables less than three miles in length; and

(H) transmitting ~~the~~ demodulated signals from the receiver system through an optical fiber to a central headend.

29. (currently amended): The method of claim 41 further comprising the step of:

(N) storing data for each of the ~~constituent~~ non-overlapping channels in separate areas of data memory.

32. (currently amended): The method of claim 31 wherein the rate at which data is written to each channel related division of the buffer is equal to the rate at which data is extracted from the buffer multiplied by the ratio of storage area devoted to the corresponding channel compared to the total storage area of the data memory dedicated to storing channel data.

33. (currently amended): The method of claim 41 further comprising the step of:

(E1) ~~the~~ an indexer providing an indication of which channel is related to data in each ~~of the~~ data memory ~~locations~~ location dedicated to storing channel data.

35. (currently amended): The method of claim 41 further comprising the step of:

(O) down-converting and decimating digitally modulated signals operating in a band that is divided into two or more non-overlapping channels, with each channel occupying no more than ~~a~~ the predetermined maximum frequency band.

36. (currently amended): The method of claim 35 wherein step (O) further comprises the steps ~~of;~~ of:

(O1) a down-converter accepting a data stream comprising samples of the entire band sampled at a rate of at least twice the frequency of the highest frequency in the band;

(O2) the down-converter converting the ~~component~~ non-overlapping channel signals within the band to baseband; and

(O3) a decimator decimating the down-converted signal received from the down-converter.

37. (currently amended): The method of claim 36 wherein the step (O2) of down-converting further comprises the step of:

(O2a) a plurality of down-converters down-converting to baseband the ~~component~~ non-overlapping channels within the band in parallel.

38. (currently amended): The method of claim ~~36~~ 37 wherein the step (O3) of decimating further comprising the step of:

(O3a) a decimator receiving the baseband channel signal from a corresponding one of the down-converters decimating the corresponding baseband channel signal to a digital data stream having two samples for each symbol period of the respective channel.

41. (currently amended): A method of providing communications comprising the steps of:

(A) transmitting digitally modulated signals operating in a band of frequencies that is divided into two or more non-overlapping channels, with each channel occupying no more than a predetermined maximum frequency band;

(B) receiving the digitally modulated signals;

(C) employing one or more analog to digital converters (ADCs), the number of ADCs being less than the number of non-overlapping channels to convert the entire band to a digital data stream sampled at a rate of at least twice the highest frequency within the band;

(D) receiving the data stream from the one or more ADCs and down-converting to baseband the data stream;

(E) decimating the data stream to produce an output data stream that represents each channel within the band, with samples for each channel within the band at a rate that is a multiple of the symbol rate for the ~~given~~ corresponding channel;

(F) sequencing through the ~~multiple~~ non-overlapping channels to phase correct, time correct and equalize the output data stream for all the ~~constituent channels;~~ non-overlapping channels, comprising the substeps of:

~~(I)~~ (G) receiving at an input the output data stream representative of the entire band, with each channel within the band converted to baseband and sampled at a rate of at least twice the symbol rate of the related channel;

~~(J)~~ (H) equalizing the data for each of the ~~constituent~~ non-overlapping channels in an equalizer circuit;

~~(K)~~ (I) recovering timing information for each of the ~~constituent~~ non-overlapping channels in a timing recovery circuit;

~~(L)~~ (J) recovering phase information for each of the ~~constituent~~ non-overlapping channels in a phase recovery circuit; and

~~(M)~~ (K) indexing the cycling of data through the equalizer, the timing recovery, and phase recovery circuits so that data related to each channel is processed by each of the ~~components~~ equalizer, the timing recovery, and phase recovery circuits in sequence, thereby requiring only one phase recovery, one timing recovery and one equalization circuit for all the channels within the ~~multi-channel~~ non-overlapping channel band.

Statement of Reasons for Allowance

2. The following is an examiner's statement of reasons for allowance:

Regarding claims 1-22, the prior art of record does not teach the limitation of "a receiver containing an indexer configured to operate on the output data stream, sequencing through the two or more non-overlap channels so that data, including phase state, time state, and equalizer state, related to each channel is processed in sequence to phase correct, time correct, and equalize the output data stream for all the non-overlapping channels."

Regarding claims 23-27, the prior art of record does not teach the step of "sequencing, by an indexer, through the two or more non-overlapping channels so that data, including phase state, time state, and equalizer state, related to each channel is processed in sequence to phase correct, time correct, and equalize the data stream for all the non-overlapping channels."

Regarding claim 29-41, the prior art of record does not teach the steps (G)-(K) recited in the independent claim.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chieh M Fan whose telephone number is (571) 272-3042. The examiner can normally be reached on Monday-Friday 8:00AM-5:30PM, Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chieh M Fan
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cmf
June 17, 2005